

CPC**COOPERATIVE PATENT CLASSIFICATION****H03D**

DEMODULATION OR TRANSFERENCE OF MODULATION FROM ONE CARRIER TO ANOTHER (masers, lasers [H01S](#) ; circuits capable of acting both as modulator and demodulator [H03C](#) ; details applicable to both modulators and frequency-changers [H03C](#) ; demodulating pulses [H03K 9/00](#); transforming types of pulse modulation [H03K 11/00](#); coding, decoding or code conversion, in general [H03M](#) ; repeater stations [H04B 7/14](#); demodulators adapted for ac systems of digital information transmission [H04L 27/00](#); synchronous demodulators adapted for colour television [H04N 9/66](#))

NOTE

This subclass covers only:

- demodulation or transference of signals modulated on a sinusoidal carrier or on electromagnetic waves;
- comparing phase or frequency of two mutually-independent oscillations.

H03D 1/00

Demodulation of amplitude-modulated oscillations ([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)

H03D 1/02

. Details

H03D 1/04

.. Modifications of demodulators to reduce interference by undesired signals

H03D 1/06

.. Modifications of demodulators to reduce distortion, e.g. by negative feedback

H03D 1/08

. by means of non-linear two-pole elements ([H03D 1/22](#), [H03D 1/26](#), [H03D 1/28](#) take precedence)

H03D 1/10

.. of diodes

H03D 1/12

... with provision for equalising ac and dc loads

H03D 1/14

. by means of non-linear elements having more than two poles ([H03D 1/22](#), [H03D 1/26](#), [H03D 1/28](#) take precedence)

H03D 1/16

.. of discharge tubes

H03D 1/18

.. of semiconductor devices

H03D 1/20

.. with provision for preventing undesired type of demodulation, e.g. preventing anode detection in a grid detection circuit

H03D 1/22

. Homodyne or synchrodyne circuits { (receiver circuits [H04B 1/30](#)) }

H03D 1/2209

.. { Decoders for simultaneous demodulation and decoding of signals composed of a sum-signal and a suppressed carrier, amplitude modulated by a difference signal, e.g. stereocoders }

H03D 1/2218

... { using diodes for the decoding }

H03D 1/2227

... { using switches for the decoding (diodes used as switches [H03D 1/2218](#)) }

H03D 1/2236

... { using a phase locked loop }

H03D 1/2245

.. { using two quadrature channels ([H03D 1/2209](#) takes precedence) }

- H03D 1/2254 . . . { and a phase locked loop }
- H03D 1/2272 . . { using FET's ([H03D 1/2209](#), [H03D 1/2245](#) and [H03D 1/2281](#) take precedence) }
- H03D 1/2281 . . { using a phase locked loop ([H03D 1/2236](#) and [H03D 1/2254](#) take precedence) }
- H03D 1/229 . . { using at least a two emitter-coupled differential pair of transistors ([H03D 1/2209](#) to [H03D 1/2281](#) take precedence) }
- H03D 1/24 . . for demodulation of signals wherein one sideband or the carrier has been wholly or partially suppressed { (receiver circuits [H04B 1/302](#)) }
- H03D 1/26 . by means of transit-time tubes
- H03D 1/28 . by deflecting an electron beam in a discharge tube ([H03D 1/26](#) takes precedence)
- H03D 3/00** **Demodulation of angle-, { frequency- or phase- } modulated oscillations ([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)**
- H03D 3/001 . { Details of arrangements applicable to more than one type of frequency demodulator ([H03D 3/28](#) takes precedence) }
- H03D 3/002 . . { Modifications of demodulators to reduce interference by undesired signals ([H03D 3/248](#) takes precedence) }
- H03D 3/003 . . { Arrangements for reducing frequency deviation, e.g. by negative frequency feedback (combined with a phase locked loop demodulator [H03D 3/242](#); changing frequency deviation for modulators [H03C 3/06](#)) }
- H03D 3/004 . . . { wherein the demodulated signal is used for controlling an oscillator, e.g. the local oscillator }
- H03D 3/005 . . . { wherein the demodulated signal is used for controlling a bandpass filter (automatic bandwidth control [H03G](#) ; automatic frequency control [H03J 7/02](#)) }
- H03D 3/006 . { by sampling the oscillations and further processing the samples, e.g. by computing techniques ([H03D 3/007](#) takes precedence) }
- H03D 3/007 . { by converting the oscillations into two quadrature related signals ([H03D 3/245](#) takes precedence) }
- H03D 3/008 . . { Compensating DC offsets }
- H03D 3/009 . . { Compensating quadrature phase or amplitude imbalances }
- H03D 3/02 . by detecting phase difference between two signals obtained from input signal ([H03D 3/28](#) to [H03D 3/32](#) take precedence; { muting in frequency-modulation receivers [H03G 3/28](#) }; limiting arrangements [H03G 11/00](#))
- H03D 3/04 . . by counting or integrating cycles of oscillations { arrangements for measuring frequencies [G01R 23/10](#) }
- H03D 3/06 . . by combining signals additively or in product demodulators
- H03D 3/08 . . . by means of diodes, e.g. Foster-Seeley discriminator
- H03D 3/10 in which the diodes are simultaneously conducting during the same half period of the signal, e.g. radio detector
- H03D 3/12 . . . by means of discharge tubes having more than two electrodes
- H03D 3/14 . . . by means of semiconductor devices having more than two electrodes
- H03D 3/16 . . . by means of electromechanical resonators
- H03D 3/18 . . by means of synchronous gating arrangements
- H03D 3/20 . . . producing pulses whose amplitude or duration depends on phase difference

- H03D 3/22 . . . by means of active elements with more than two electrodes to which two signals are applied derived from the signal to be demodulated and having a phase difference related to the frequency deviation, e.g. phase detector
- H03D 3/24 . . . Modifications of demodulators to reject or remove amplitude variations by means of locked-in oscillator circuits
- H03D 3/241 . . . { the oscillator being part of a phase locked loop }
- H03D 3/242 { combined with means for controlling the frequency of a further oscillator, e.g. for negative frequency feedback or AFC }
- H03D 3/244 { combined with means for obtaining automatic gain control }
- H03D 3/245 { using at least twophase detectors in the loop ([H03D 3/244](#) takes precedence; in general [H03L 7/087](#)) }
- H03D 3/247 { using a controlled phase shifter (in general [H03L 7/081](#)) }
- H03D 3/248 { with means for eliminating interfering signals, e.g. by multiple phase locked loops (multiple loops in general [H03L 7/07](#), [H03L 7/22](#)) }

- H03D 3/26 . . by means of sloping amplitude/frequency characteristic of tuned or reactive circuit ([H03D 3/28](#) to [H03D 3/32](#) takes precedence)
- H03D 3/28 . . Modifications of demodulators to reduce effects of temperature variations ({ automatic frequency regulation in receivers [H03J](#) }; automatic frequency control [H03L](#))
- H03D 3/30 . . by means of transit-time tubes
- H03D 3/32 . . by deflecting an electron beam in a discharge tube ([H03D 3/30](#) takes precedence)
- H03D 3/34 . . by means of electromechanical devices ([H03D 3/16](#) takes precedence)

- H03D 5/00** **Circuits for demodulating amplitude-modulated or angle-modulated oscillations at will** ([H03D 9/00](#), [H03D 11/00](#) take precedence)

- H03D 7/00** **Transference of modulation from one carrier to another, e.g. frequency-changing** ([H03D 9/00](#), [H03D 11/00](#) take precedence; dielectric amplifiers, magnetic amplifiers, parametric amplifiers used as a frequency-changers [H03F](#))

- H03D 7/005 . . { by means of superconductive devices }
- H03D 7/02 . . by means of diodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/04 . . . having { a partially } negative resistance characteristic, e.g. tunnel diode
- H03D 7/06 . . by means of discharge tubes having more than two electrodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/08 . . the signals to be mixed being applied between the same two electrodes
- H03D 7/10 . . the signals to be mixed being applied between different pairs of electrodes
- H03D 7/12 . . by means of semiconductor devices having more than two electrodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/125 . . { with field effect transistors }
- H03D 7/14 . . Balanced arrangements

- H03D 7/1408 . . { with diodes }
- H03D 7/1416 . . { with discharge tubes having more than two electrodes }
- H03D 7/1425 . . { with transistors }

WARNING

Subgroups [H03D 7/1433](#) to [H03D 7/1491](#) are incomplete pending reclassification; see also this group and its other subgroups

- H03D 7/1433 . . . { using bipolar transistors ([H03D 7/145](#) takes precedence) }
- H03D 7/1441 . . . { using field-effect transistors ([H03D 7/145](#) takes precedence) }
- H03D 7/145 . . . { using a combination of bipolar transistors and field-effect transistors }
- H03D 7/1458 . . . { Double balanced arrangements, i.e. where both input signals are differential }
- H03D 7/1466 . . . { Passive mixer arrangements }
- H03D 7/1475 . . . { Subharmonic mixer arrangements }
- H03D 7/1483 . . . { comprising components for selecting a particular frequency component of the output }
- H03D 7/1491 . . . { Arrangements to linearise a transconductance stage of a mixer arrangement }

- H03D 7/16 . Multiple-frequency-changing
- H03D 7/161 . . { all the frequency changers being connected in cascade }
- H03D 7/163 . . . { the local oscillations of at least two of the frequency changers being derived from a single oscillator }
- H03D 7/165 . . { at least two frequency changers being located in different paths, e.g. in two paths with carriers in quadrature (combined with amplitude demodulation [H03D 1/2245](#), combined with angle demodulation [H03D 3/007](#); N-path filters [H03H 19/002](#)) }
- H03D 7/166 . . . { using two or more quadrature frequency translation stages }
- H03D 7/168 { using a feedback loop containing mixers or demodulators }

- H03D 7/18 . Modifications of frequency-changers for eliminating image frequencies { ([H03D 7/16](#) takes precedence) }

- H03D 7/20 . by means of transit-time tubes

- H03D 7/22 . by deflecting an electron beam in a discharge tube ([H03D 7/20](#) takes precedence)

H03D 9/00 Demodulation or transference of modulation of modulated electromagnetic waves (demodulating light, transferring modulation in light waves [G02F 2/00](#))

- H03D 9/02 . Demodulation using distributed inductance and capacitance, e.g. in feeder lines
- H03D 9/04 . . for angle-modulated oscillations

- H03D 9/06 . Transference of modulation using distributed inductance and capacitance
- H03D 9/0608 . . { by means of diodes }
- H03D 9/0616 . . . { mounted in a hollow waveguide ([H03D 9/0641](#) takes precedence) }
- H03D 9/0625 . . . { mounted in a coaxial resonator structure }
- H03D 9/0633 . . . { mounted on a stripline circuit }
- H03D 9/0641 { located in a hollow waveguide }

- H03D 9/065 . . { by means of discharge tubes having more than two electrodes }
- H03D 9/0658 . . { by means of semiconductor devices having more than two electrodes }
- H03D 9/0666 . . . { using bipolar transistors ([H03D 9/0683](#) takes precedence) }
- H03D 9/0675 . . . { using field effect transistors ([H03D 9/0683](#) takes precedence) }
- H03D 9/0683 . . . { using a combination of bipolar transistors and field effect transistors }

H03D 11/00 Super-regenerative demodulator circuits { applications in responders [G01S](#) }

- H03D 11/02 . for amplitude-modulated oscillations
- H03D 11/04 . . by means of semiconductor devices having more than two electrodes
- H03D 11/06 . for angle-modulated oscillations
- H03D 11/08 . . by means of semiconductor devices having more than two electrodes

H03D 13/00 Circuits for comparing the phase or frequency of two mutually-independant oscillations { (measuring phase [G01R 25/00](#); phase-discriminators with yes/no output [G01R 25/005](#)) }

- H03D 13/001 . { in which a pulse counter is used followed by a conversion into an analog signal }
- H03D 13/002 . . { the counter being an up-down counter }
- H03D 13/003 . { in which both oscillations are converted by logic means into pulses which are applied to filtering or integrating means }
- H03D 13/004 . . { the logic means delivering pulses at more than one terminal, e.g. up and down pulses }
- H03D 13/005 . { in which one of the oscillations is, or is converted into, a signal having a special waveform, e.g. triangular }
- H03D 13/006 . . { and by sampling this signal by narrow pulses obtained from the second oscillation }
- H03D 13/007 . { by analog multiplication of the oscillations or by performing a similar analog operation on the oscillations }
- H03D 13/008 . . { using transistors }
- H03D 13/009 . . { using diodes }

H03D 99/00 Subject matter not provided for in other groups of this subclass

H03D 2001/00 Demodulation of amplitude-modulated oscillations ([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)

- H03D 2001/22 . Homodyne or synchrodyne circuits { (receiver circuits [H04B 1/30](#)) }
- H03D 2001/2245 . . { using two quadrature channels ([H03D 1/2209](#) takes precedence) }
- H03D 2001/2254 . . . { and a phase locked loop }
- H03D 2001/2263 including a counter or a divider in the PLL

H03D 2009/00 Demodulation or transference of modulation of modulated electromagnetic waves (demodulating light, transferring modulation in light waves [G02F 2/00](#))

- H03D 2009/06 . Transference of modulation using distributed inductance and capacitance
- H03D 2009/0691 .. by means of superconductive devices

H03D 2200/00 Indexing scheme relating to details of demodulation or transference of modulation from one carrier to another covered by [H03D](#)

- H03D 2200/0001 . Circuit elements of demodulators
- H03D 2200/0003 .. Rat race couplers
- H03D 2200/0005 .. Wilkinson power dividers or combiners
- H03D 2200/0007 .. Dual gate field effect transistors
- H03D 2200/0009 .. Emitter or source coupled transistor pairs or long tail pairs
- H03D 2200/0011 .. Diodes
- H03D 2200/0013 ... Diodes connected in a ring configuration
- H03D 2200/0015 ... Diodes connected in a star configuration
- H03D 2200/0017 .. Intermediate frequency filter
- H03D 2200/0019 .. Gilbert multipliers
- H03D 2200/0021 .. Frequency multipliers
- H03D 2200/0023 .. Balun circuits
- H03D 2200/0025 .. Gain control circuits
- H03D 2200/0027 ... including arrangements for assuring the same gain in two paths
- H03D 2200/0029 .. Loop circuits with controlled phase shift
- H03D 2200/0031 .. PLL circuits with quadrature locking, e.g. a Costas loop
- H03D 2200/0033 .. Current mirrors
- H03D 2200/0035 .. Digital multipliers and adders used for detection
- H03D 2200/0037 .. Diplexers
- H03D 2200/0039 .. Exclusive OR logic circuits
- H03D 2200/0041 . Functional aspects of demodulators
- H03D 2200/0043 .. Bias and operating point
- H03D 2200/0045 .. Calibration of demodulators
- H03D 2200/0047 .. Offset of DC voltage or frequency
- H03D 2200/0049 .. Analog multiplication for detection
- H03D 2200/005 .. Analog to digital conversion
- H03D 2200/0052 .. Digital to analog conversion
- H03D 2200/0054 .. Digital filters
- H03D 2200/0056 ... including a digital decimation filter
- H03D 2200/0058 ... using a digital filter with interpolation
- H03D 2200/006 .. Signal sampling
- H03D 2200/0062 ... Computation of input samples, e.g. successive samples
- H03D 2200/0064 .. Detection of passages through null of a signal
- H03D 2200/0066 .. Mixing
- H03D 2200/0068 ... by computation

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| H03D 2200/007 | ... | by using a logic circuit, e.g. flipflop, XOR |
| H03D 2200/0072 | ... | by complex multiplication |
| H03D 2200/0074 | ... | using a resistive mixer or a passive mixer |
| H03D 2200/0076 | ... | using a distributed mixer |
| H03D 2200/0078 | ... | using a switched phase shifter or delay line |
| H03D 2200/008 | .. | Hilbert type transformation |
| H03D 2200/0082 | .. | Quadrature arrangements |
| H03D 2200/0084 | .. | Lowering the supply voltage and saving power |
| H03D 2200/0086 | .. | Reduction or prevention of harmonic frequencies |
| H03D 2200/0088 | .. | Reduction of intermodulation, nonlinearities, adjacent channel interference; intercept points of harmonics or intermodulation products |
| H03D 2200/009 | .. | Reduction of local oscillator or RF leakage |
| H03D 2200/0092 | .. | Detection or reduction of fading in multipath transmission arrangements |
| H03D 2200/0094 | .. | Measures to address temperature induced variations of demodulation |
| H03D 2200/0096 | ... | by stabilising the temperature |
| H03D 2200/0098 | ... | by compensating temperature induced variations |